

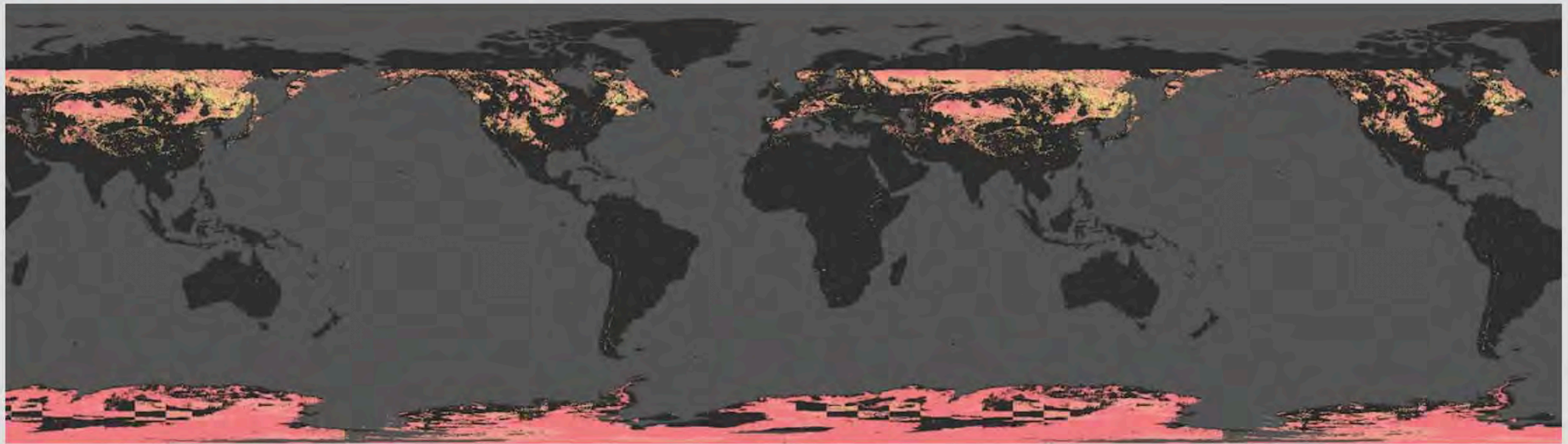
EXHIBIT 2

*Archival Satellite Images from NASA's Fire Information for
Resource Management Systems ("FIRMS"),
dated January 19–April 23, 2022*

<https://firms.modaps.eosdis.nasa.gov/usfs/map/#d:24hrs;@-100.0,40.0,4.0z> (Accessed: Apr. 21, 2025)

FIRMS US/CANADA LAYER INFORMATION

SNOW COVER (NORMALIZED DIFFERENCE SNOW INDEX) VIIRS NOAA-20



TEMPORAL COVERAGE: 05 JANUARY 2018 - PRESENT

In the context of fire management, this dataset is added to FIRMS for use by fire managers to monitor annual recession of the snow line to inform when/where to start monitoring for the potential risk of wildland fire activity.

The Snow Cover (Normalized Difference Snow Index (NDSI)) layer shows an estimate of snow cover. It is derived from radiance data acquired by the Visible Infrared Imaging Radiometer Suite (VIIRS) aboard the Joint Polar Satellite System's first satellite (JPSS-1/NOAA-20). Snow-covered land typically has very high reflectance in visible bands and very low reflectance in the shortwave infrared bands. The Normalized Difference Snow Index (NDSI) reveals the magnitude of this difference, with values greater than 0 typically indicating the presence of at least some snow. The VIIRS snow cover algorithm computes NDSI using VIIRS image bands I1 (0.64 μm , visible red) and I3 (1.61 μm , shortwave near-infrared) and then applies a series of data screens designed to alleviate likely errors and flag uncertain snow detections.

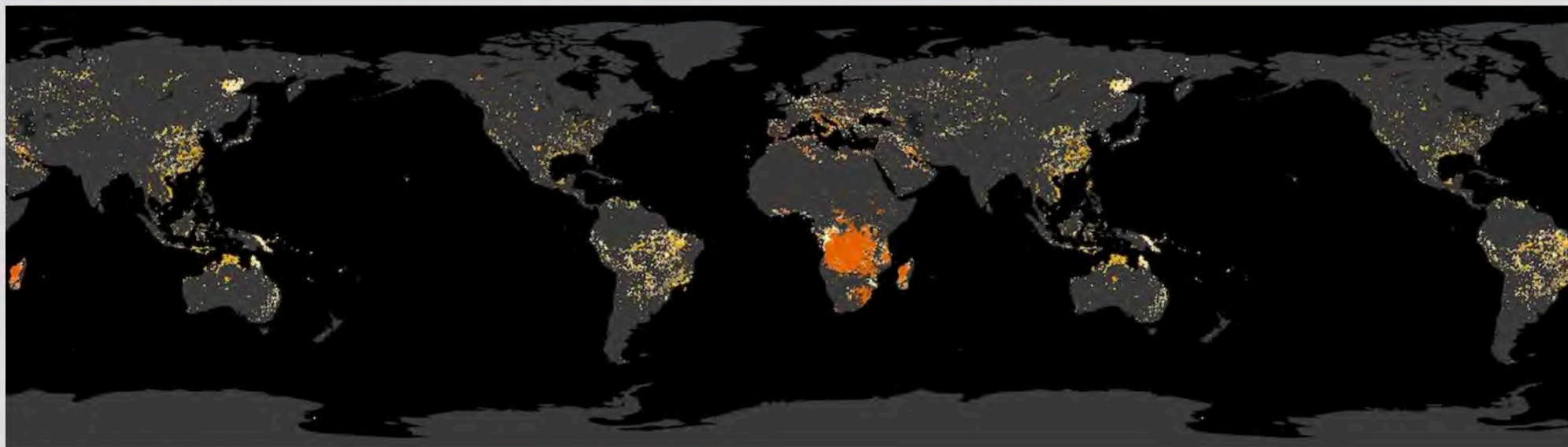
The Snow Cover (Normalized Difference Snow Index) layer is available from both the joint NASA/NOAA Suomi NPP (VNP10) and NOAA-20 (VJ110) satellites. The sensor resolution is 375 m, imagery resolution is 500 m, and the temporal resolution is daily.

References: VJ110_NRT [doi:10.5067/VIIRS/VJ110_NRT.002](https://doi.org/10.5067/VIIRS/VJ110_NRT.002); VJ110 [doi:10.5067/JNKFY4XFDHRN](https://doi.org/10.5067/JNKFY4XFDHRN)

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VIIRS (SUOMI NPP, NOAA-20 AND NOAA-21) FIRES AND THERMAL ANOMALIES (DAY | NIGHT, 375M)



VIIRS S-NPP TEMPORAL COVERAGE: 20 JANUARY 2012 - PRESENT

VIIRS NOAA-20 TEMPORAL COVERAGE: 1 JANUARY 2020 - PRESENT

VIIRS NOAA-21 TEMPORAL COVERAGE: 17 JANUARY 2024 - PRESENT

Latency - defined as time since satellite observation and the data being available in FIRMS:

within 3 hours for global data and

within 1-30 minutes for ultra and real-time in the US and Canada (see 'version' in attribute table below).

The VIIRS (Visible Infrared Imaging Radiometer Suite) Fire layer shows active fire detections and thermal anomalies, such as volcanoes, and gas flares. The fire layer is useful for studying the spatial and temporal distribution of fire, to locate persistent hot spots such as volcanoes and gas flares, to locate the source of air pollution from smoke that may have adverse human health impacts.

VIIRS is the successor to MODIS for Earth science data product generation. The 375m I-band data complements the MODIS fire detections; they both show good agreement in hotspot detection but the improved spatial resolution of the 375m data provides a greater response over fires of relatively small areas and provides improved mapping of large fire perimeters. The 375m data also has improved nighttime performance. Consequently, these data are well suited for

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use in support of fire management (e.g., near real-time alert systems), as well as other science applications requiring improved fire mapping fidelity.

The VIIRS Fire and Thermal Anomalies product is available from the joint NASA/NOAA Suomi-National Polar orbiting Partnership (S-NPP), NOAA-20 (JPSS-1) and NOAA-21 (JPSS-2) satellites. The sensor resolution is 375 m, imagery resolution is 250 m, and the temporal resolution is twice daily. The thermal anomalies are represented as red points (approximate center of a 375m pixel). The nominal (equator-crossing) observation times for VIIRS S-NPP are 1:30pm and 1:30am. The orbit of NOAA-21 is about 50 minutes ahead of NOAA-20 with S-NPP orbiting between them. Consequently, all three sensors conduct observations within approximately 1 hour of one another. Thanks to its polar orbit, mid-latitudes will experience 3-4 looks a day.

Attributes:

Attribute	Short Description	Long Description
Latitude	Latitude	Center of nominal 375 m fire pixel.
Longitude	Longitude	Center of nominal 375 m fire pixel.
Bright_ti4 / Brightness (in web services)	Brightness temperature I-4	VIIRS I-4 channel brightness temperature of the fire pixel measured in Kelvin.
Scan	Along Scan pixel size	The algorithm produces approximately 375 m pixels at nadir. Scan and track reflect actual pixel size.
Track	Along Track pixel size	The algorithm produces approximately 375 m pixels at nadir. Scan and track reflect actual pixel size.
Acq_Date	Acquisition Date	Date of VIIRS acquisition.
Acq_Time	Acquisition Time	Time of acquisition/overpass of the satellite (in UTC).
Satellite	Satellite	N = Suomi National Polar-orbiting Partnership (Suomi NPP). N20 = NOAA-20 (JPSS1). N21 = NOAA-21 (JPSS2).
		This value is based on a collection of intermediate algorithm quantities used in the detection process. It is intended to help users gauge the quality of individual hotspot/fire pixels. Confidence values are set to low (l), nominal (n), and high (h). Low (l) confidence daytime fire pixels are typically associated with areas of Sun glint and lower relative temperature anomaly (<15 K) in the mid-infrared channel I4. Nominal (n)

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Confidence	Confidence	<p>This value is based on a collection of intermediate algorithm quantities used in the detection process. It is intended to help users gauge the quality of individual hotspot/fire pixels. Confidence values are set to low (l), nominal (n), and high (h). Low (l) confidence daytime fire pixels are typically associated with areas of Sun glint and lower relative temperature anomaly (<15 K) in the mid-infrared channel I4. Nominal (n) confidence pixels are those free of potential Sun glint contamination during the day and marked by strong (>15 K) temperature anomaly in either day or nighttime data. High (h) confidence fire pixels are associated with day or nighttime saturated pixels.</p> <p>Please note: Low confidence nighttime pixels occur only over the geographic area extending from 11° E to 110° W and 7° N to 55° S. This area describes the region of influence of the South Atlantic Magnetic Anomaly which can cause spurious brightness temperatures in the mid-infrared channel I4 leading to potential false positive alarms. These have been removed from the NRT data distributed by FIRMS.</p>
Version	Version (collection and source)	<p>Version identifies the collection (e.g., VIIRS Collection 1 or VIIRS Collection 2), and source of data processing (Ultra Real-Time (URT suffix added to collection), Real-Time (RT suffix), Near Real-Time (NRT suffix) or Standard Processing (collection only). For example:</p> <p>"2.0URT" - Collection 2 Ultra Real-Time processing. "2.0RT" - Collection 2 Real-Time processing. "1.0NRT" - Collection 1 Near Real-Time processing. "1.0" - Collection 1 Standard processing.</p>
Bright_ti5 / Brightness_2 (in web services)	Brightness temperature I-5	I-5 Channel brightness temperature of the fire pixel measured in Kelvin.
FRP	Fire Radiative Power	<p>FRP depicts the pixel-integrated fire radiative power in megawatts (MW). Given the unique spatial and spectral resolution of the data, the VIIRS 375 m fire detection algorithm was customized and tuned to optimize its response over small fires while balancing the occurrence of false alarms. Frequent saturation of the mid-infrared I4 channel (3.55-3.93 μm) driving the detection of active fires requires additional tests and procedures to avoid pixel classification errors. As a result, sub-pixel fire characterization (e.g., fire</p>

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FRP	Fire Radiative Power	FRP depicts the pixel-integrated fire radiative power in megawatts (MW). Given the unique spatial and spectral resolution of the data, the VIIRS 375 m fire detection algorithm was customized and tuned to optimize its response over small fires while balancing the occurrence of false alarms. Frequent saturation of the mid-infrared I4 channel (3.55-3.93 μm) driving the detection of active fires requires additional tests and procedures to avoid pixel classification errors. As a result, sub-pixel fire characterization (e.g., fire radiative power [FRP] retrieval) is only viable across small and/or low-intensity fires. Systematic FRP retrievals are based on a hybrid approach combining 375 and 750 m data. In fact, starting in 2015 the algorithm incorporated additional VIIRS channel M13 (3.973-4.128 μm) 750 m data in both aggregated and unaggregated format.
Type*	Inferred hot spot type	0 = presumed vegetation fire 1 = active volcano 2 = other static land source 3 = offshore detection (includes all detections over water)
DayNight	Day or Night	D= Daytime fire, N= Nighttime fire

Type* = This attribute is only available for VNP14IMGT (standard quality) data

more details:

[VIIRS S-NPP NRT fire](#)

[VIIRS NOAA-20 NRT fire](#)

[VIIRS NOAA-21 NRT fire](#)

DYNAMIC IMAGERY



GOES EAST GEOCOLOR (TRUE COLOR (DAY), MULTISPECTRAL IR (NIGHT))



GOES WEST GEOCOLOR (TRUE COLOR (DAY), MULTISPECTRAL IR (NIGHT))

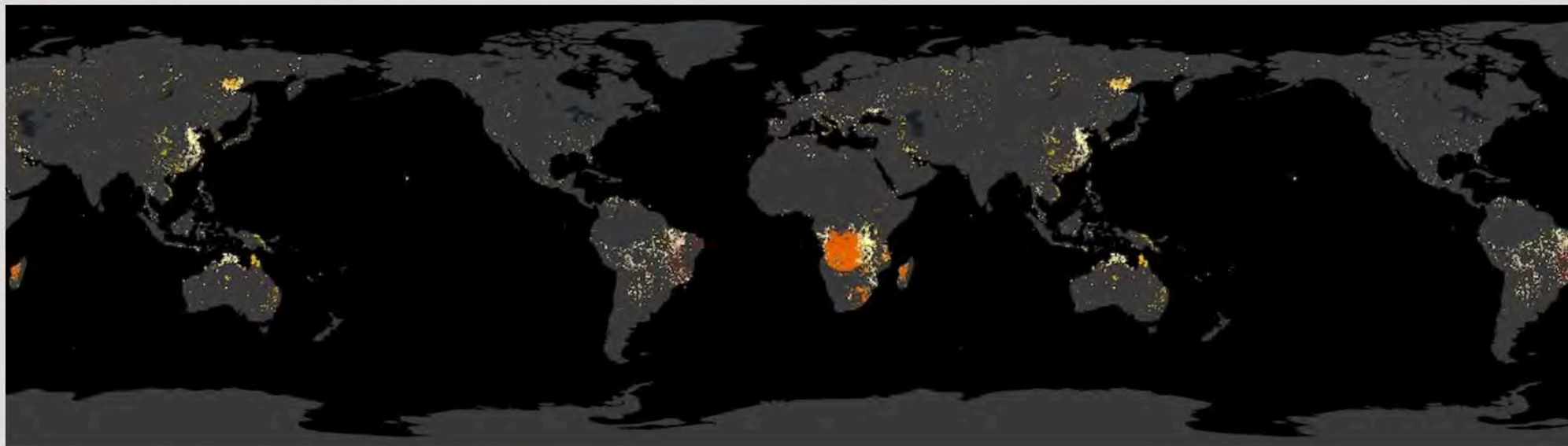


LANDSAT 8/9 ADJUSTED REFLECTANCE HLS S30 NADIR BRDF (TRUE COLOR)



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 MODIS (AQUA & TERRA) FIRE AND THERMAL ANOMALIES (DAY | NIGHT, 1KM)



AQUA TEMPORAL COVERAGE: 3 JULY 2002 - PRESENT
TERRA TEMPORAL COVERAGE: 1 NOVEMBER 2000 - PRESENT

Latency - defined as time since satellite observation and the data being available in FIRMS:
 within 3 hours for global data and
 within 1-30 minutes for ultra and real-time in the US and Canada (see 'version' in attribute table below).

The MODIS Fire and Thermal Anomalies layer shows active fire detections and thermal anomalies, such as volcanoes, and gas flares. Fires can be set naturally, such as by lightning, or by humans, whether intentionally or accidentally. The fire layer is useful for studying the spatial and temporal distribution of fire, to locate persistent hot spots such as volcanoes and gas flares, to locate the source of air pollution from smoke that may have adverse human health impacts.

The MODIS Fire and Thermal Anomalies product is available from the Terra (MOD14) and Aqua (MYD14) satellites as well as a combined Terra and Aqua (MCD14) satellite product. The sensor resolution is 1 km, and the temporal resolution is daily. The thermal anomalies are represented as red points (approximate center of a 1 km pixel). Terra's orbit around the Earth is timed so that it passes from north to south across the equator in the morning, while Aqua

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passes south to north over the equator in the afternoon.

Attributes:







Attribute	Short Description	Long Description
Latitude	Latitude	Center of 1 km fire pixel, but not necessarily the actual location of the fire as one or more fires can be detected within the 1 km pixel.
Longitude	Longitude	Center of 1 km fire pixel, but not necessarily the actual location of the fire as one or more fires can be detected within the 1 km pixel.
Brightness	Brightness temperature 21 (Kelvin)	Channel 21/22 brightness temperature of the fire pixel measured in Kelvin.
Scan	Along Scan pixel size	The algorithm produces 1 km fire pixels, but MODIS pixels get bigger toward the edge of scan. Scan and track reflect actual pixel size.
Track	Along Track pixel size	The algorithm produces 1 km fire pixels, but MODIS pixels get bigger toward the edge of scan. Scan and track reflect actual pixel size.
Acq_Date	Acquisition Date	Data of MODIS acquisition.
Acq_Time	Acquisition Time	Time of acquisition/overpass of the satellite (in UTC).
Satellite	Satellite	A = Aqua and T = Terra.
Confidence	Confidence (0-100%)	This value is based on a collection of intermediate algorithm quantities used in the detection process. It is intended to help users gauge the quality of individual hotspot/fire pixels. Confidence estimates range between 0 and 100% and are assigned one of the three fire classes (low-confidence fire, nominal-confidence fire, or high-confidence fire).
Version	Version (Collection	Version identifies the collection (e.g., MODIS Collection 6.1) and source of data processing (Ultra Real-Time (URT suffix added to collection), Real-Time (RT suffix), Near Real-Time (NRT suffix) or Standard Processing (collection only). For example: "6.1URT" - Collection 6.1 Ultra Real-Time processing.

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Version	and source)	<p>"6.1RT" - Collection 6.1 Real-Time processing.</p> <p>"6.1NRT" - Collection 61 Near Real-Time processing.</p> <p>"6.1" - Collection 61 Standard processing.</p> <p>Find out more on collections and on the differences between FIRMS data sourced from LANCE FIRMS and the University of Maryland.</p>
Bright_T31	Brightness temperature 31 (Kelvin)	Channel 31 brightness temperature of the fire pixel measured in Kelvin.
FRP	Fire Radiative Power (MW - megawatts)	Depicts the pixel-integrated fire radiative power in MW (megawatts).
Type*	Inferred hot spot type	<p>0 = presumed vegetation fire</p> <p>1 = active volcano</p> <p>2 = other static land source</p> <p>3 = offshore</p>
DayNight	Day or Night	D= Daytime fire, N= Nighttime fire

Type* = This attribute is only available for MCD14DL (standard quality) data

[more details](#)

	MODIS TERRA/AQUA GLOBAL BURNED AREA PRODUCT (MCD64A1)	+
	US ACTIVE FIRES - IMSR	+
	US ACTIVE FIRES - IRWIN	+
	US FIRE PERIMETER	+
	US FIRE WEATHER WATCH	+
	US RED FLAG WARNING	+

